Attachment 1

Protocol for Piloting the Evaluation and Implementation of Process Modifications on an Electric Arc Furnace

As required by this Consent Decree, Nucor will evaluate and implement process modifications at its Norfolk facility. The modifications are aimed at reducing Nitrogen Oxide (NOx) emissions from the electric arc furnace. This protocol sets forth the process modifications that Nucor will evaluate and the approach Nucor will use to evaluate the impact of these modifications. Any provisions of this protocol, including schedule, may be modified by the written agreement of the United States and Nucor at any time.

A. Approach for Norfolk Facility

Before initiating any testing program, Nucor will submit to EPA for approval a detailed monitoring and testing plan. The plan will include a description of the test methods to be used, a discussion of test procedures, and a description of sampling locations.

1. Baseline testing - Nucor shall use continuous emissions monitors (CEMs) to monitor and record Carbon Monoxide (CO), NOx, Sulfur Oxides (SOx), Oxygen (O2), Carbon Dioxide (CO2), velocity, and temperature for a period of 30 days. During this time, Nucor will also periodically monitor the exhaust gas moisture content. The data collected during this baseline testing period will provide information on the impact of typical operating and process variables on emissions. The data will also be used to identify a "worst case" combination of operating variables (i.e. the combination of operating variables that results in the highest rate of NOx emissions) which will be used in evaluating the process modifications (see below). Nucor and EPA will meet at the conclusion of the baseline testing to determine the conditions that should be used for next phase of the process, that is, evaluation of the process modifications.

2. Evaluation of Process Modifications - Nucor will evaluate the impact of the following process modifications on NOx and CO emissions:

- Replace carrier gas in carbon injectors
- Reduce roof ring gap

- Keep slag door closed when possible
- Improve foamy slag practice
- Run heats with single charge

Each of these process modifications will be implemented individually on heats that represent the worst case conditions established in the baseline testing. During each heat, Nucor will use the CEMs to monitor and record CO, CO2, O2, NOx, and SOx emissions. Nucor will also monitor and record the exhaust gas velocity and temperature and periodically monitor the exhaust gas moisture content. If both EPA and Nucor agree that the data is representative or cannot be repeated on a comparative basis, the specific process modification test will be considered complete.

Nucor will implement all process modifications that are deemed to be economically and technically feasible as defined in the Consent Decree.

3. Report to EPA - Nucor will prepare a report for EPA that will include a discussion of the results, the process modifications that were implemented and tested at the facility, any problems encountered in implementing the process modifications, and the impact of the process modifications on NOx and CO emissions. Nucor will also include a discussion on the merits of conducting a pilot study at a second Nucor facility based on the effectiveness of the Norfolk pilot study in reducing emissions. Nucor will also include a recommendation for a second pilot facility and a schedule for implementing the second pilot study.

4. Schedule for Norfolk pilot

Table 1 presents a schedule for the process modifications evaluation and implementation pilot at the Norfolk facility.

TABLE 1. PROCESS MODIFICATIONS PILOT SCHEDULE

ACTIVITY	PROJECTED DATE
Submit test plan to EPA	March 15, 2001
Baseline testing	May 15, 2001
Evaluation testing	July 15 - September 15, 2001

B. Second Pilot Study

Prior to beginning the second pilot study, Nucor will conduct a preliminary technical and economic feasibility determination to identify those process modifications that will also be evaluated for the second pilot program. This preliminary evaluation will be based on data collected at the Norfolk facility including information on emissions reductions and problems encountered in implementing the modifications. It will also include an estimated cost for installing the modification at the second pilot facility.

In addition to the process modifications identified for the Norfolk facility, there are other process modifications that Nucor has identified that may reduce NOx emissions. These modifications were not applicable to the Norfolk facility, but they may be applicable to the second pilot facility. These modifications include:

- Reduce furnace elbow gap
- Plug gaps in water-cooled panels
- Gravity feed carbon and lime
- Reduce power-on time
- Improve seal on slag door

Nucor will review these additional modifications to determine if they are applicable to the second pilot facility. Nucor will then include the applicable modifications in the evaluation and implementation program.

Prior to beginning the second pilot program, Nucor will submit a brief report to EPA that will include a discussion of the process modifications that will be implemented during the pilot and how those process modifications were selected, an overview of the approach that will be used for implementing the pilot, and a proposed schedule for the pilot.

Following completion of the second pilot, Nucor will prepare and submit to EPA a report that will include a discussion of the results, the process modifications that were evaluated and implemented at the facility, any problems encountered in implementing the process modifications, and the impact of the process modifications on NOx and CO emissions. The report will also include a discussion of Nucor's recommendation concerning implementing the process modifications at its remaining steel mills. This recommendation will be based on an evaluation of the economic and technical feasibility of implementing the process modifications at the two pilot facilities. If Nucor does not believe the process modifications were successful, as defined by the consent decree, then the report will also include an evaluation of other potential alternatives for reducing NOx emissions.